

15W, AC-DC converter



CE Report
EN62368-1
EN 60950-1

CB
IEC60950-1

UK
BS EN 62368-1
BS EN 60950-1

RoHS



FEATURES

- Wide input voltage range: 85 - 264VAC/100 - 370VDC
- Regulated output, low ripple & noise
- Up to 84% efficiency
- Output short circuit, over-current, over-voltage protection
- Plastic case meets UL94V-0 flammability
- IEC/EN60950, EN62368 safety approval, UL60950
- EN60950 safety approval (LH15-10D0524-02)
- Mounting: PCB mounting, Chassis mounting, DIN-Rail mounting available

LH15-10A/B/C/Dxx series —is one of Mornsun's compact size power converters. It features universal AC input and at the same time accepts DC input voltage, low power consumption, high efficiency, high reliability and reinforced isolation. It offers good EMC performance compliant to IEC/EN61000-4, CISPR32/EN55032, UL/EN60950 standards and are widely used in industrial, office and civil applications. For extremely harsh EMC environment, we recommend using the application circuit show in Design Reference of this datasheet.

Selection Guide

Certification	Part No.*	Output Power	Nominal Output Voltage and Current		Efficiency at 230VAC(%) Typ.	Capacitive Load (uF)Max.	
			(Vo1/Io1)	(Vo2/Io2)		Vo1	Vo2
IEC/EN	LH15-10B03	9.9W	3.3V/3000mA	--	73	36000	--
	LH15-10B05	14W	5V/2800mA	--	76	20000	--
	LH15-10B09		9V/1600mA	--	78	8000	--
	LH15-10B12		12V/1250mA	--	80	5200	--
	LH15-10B15		15V/1000mA	--	80	5000	--
	LH15-10B24		24V/625mA	--	84	900	--
--	LH15-10A05	15W	+5V/1500mA	-5V/1500mA	76	12800	12800
	LH15-10A12		+12V/650mA	-12V/650mA	81	2350	2350
	LH15-10A15		+15V/500mA	-15V/500mA	83	3120	3120
	LH15-10A24		+24V/310mA	-24V/310mA	83	400	400
IEC/EN	LH15-10C0505-05		5V/2000mA	±5V/500mA	75	10800	2160
	LH15-10C0512-02		5V/2000mA	±12V/200mA	77	17280	2160
	LH15-10C0515-02		5V/1800mA	±15V/200mA	78	5920	370
	LH15-10C0524-01		5V/2000mA	±24V/100mA	78	1600	130
--	LH15-10D0505-08		5V/2200mA	5V/800mA	78	15000	3000
	LH15-10D0512-04		5V/2000mA	12V/400mA	80	12000	1800
	LH15-10D0515-03		5V/2000mA	15V/300mA	81	10000	1500
EN	LH15-10D0524-02		5V/2000mA	24V/200mA	81	13000	800

Note: 1. *Only LH15-10Axx use both outputs(positive and negative) as sampling feedback, the others use Vo1 and defined as first output.

2. The product picture is for reference only. For details, please refer to the actual product.

Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Input Voltage Range	AC Input	85	--	264	VAC
	DC Input	100	--	370	VDC
Input Frequency		47	--	63	Hz
Input Current	115VAC	--	--	0.37	A
	230VAC	--	--	0.22	
Inrush Current	115VAC	--	10	--	
	230VAC	--	20	--	
Leakage Current	230VAC/50Hz	0.3mA RMS typ.			

Recommended External Input Fuse(Special package series include fuse)		2A/250V, slow-blow
Hot Plug		Unavailable

Output Specifications

Item	Operating Conditions				Min.	Typ.	Max.	Unit
Output Voltage Accuracy	Main circuit	3.3V Output		--	±3	--	%	
		Others output		--	±2	--		
Line Regulation	Full load	Main circuit		--	±0.5	--		
		Auxiliary circuit		--	±1.5	--		
Load Regulation	10% - 100% load	Single output		--	±1	--		
		Dual output(balanced load)		--	±2	--		
		Isolated triple output (balanced load)	Main circuit Vo1	--	±3	--		
			Auxiliary circuit ±Vo2	--	±5	--		
		Isolated and separated twin output (balanced load)	Main circuit Vo1	--	±3	--		
			Auxiliary circuit Vo2	--	±5	--		
Ripple & Noise*	Main circuit	20MHz bandwidth (peak-to-peak value)		--	50	100	mV	
Temperature Coefficient	Main circuit			--	±0.02	--	%/°C	
Short Circuit Protection					Continuous, self-recover			
Over-current Protection					≥110%Io, self-recover			
Over-voltage Protection	Main circuit	3.3 / 5VDC Output		≤7.5VDC				
		9VDC Output		≤13VDC				
		12 /15VDC Output		≤20VDC				
		24VDC Output		≤30VDC				
Minimum Load	Single output			0	--	--	%	
	Dual output (balanced load)			10	--	--		
	Isolated and separated twin output (balanced load)			10	--	--		
	Isolated triple output (balanced load)			10	--	--		
Hold-up Time	115VAC input			--	15	--	ms	
	230VAC input			--	80	--		

Note: * The "parallel cable" method is used for ripple and noise test, please refer to AC-DC Converter Application Notes for specific information.

General Specifications

General specifications		Item	Operating Conditions		Min.	Typ.	Max.	Unit
Isolation	Input-output	Test time: 1min.	3000	--	--	VAC		
	Input- 		2000	--	--			
Operating Temperature			-40	--	+70	℃		
Storage Temperature			-40	--	+105			
Storage Humidity			--	--	95	%RH		
Soldering Temperature		Wave-soldering	260 ± 5℃; time: 5 - 10s					
		Manual-welding	360 ± 10℃; time: 3 - 5s					
Switching Frequency			--	65	--	kHz		
Power Derating		-40℃ to -10℃	2.0	--	--	% /℃		
		+55℃ to +70℃	4.0	--	--			
		85VAC - 100VAC	1.67	--	--	% /VAC		
		240VAC - 264VAC	0.83	--	--			
Safety Standard		LH15-10D0524-02	EN62368-1 safety approved					
		LH15-10B/Cxx	IEC/EN60950-1, EN/BS EN62368-1 safety approved; Design refer to UL60950-1					
Safety Class		Single output	CLASS II					

	Other series	CLASS I
MTBF		MIL-HDBK-217F@25°C > 300,000 h

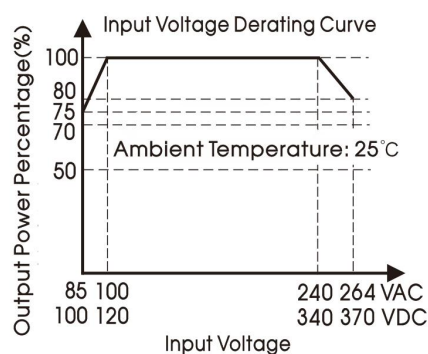
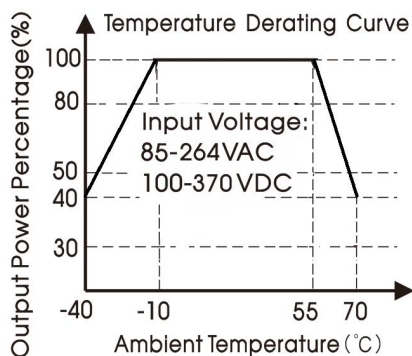
Mechanical Specifications

Case Material	Black plastic, flame-retardant and heat-resistant (UL94V-0)	
Dimension	Horizontal package	62.00 x 45.00 x 22.50mm
	A2 chassis mounting	96.10 x 54.00 x 31.00mm
	A4 Din-Rail mounting	96.10 x 54.00 x 35.60 mm
Weight	Horizontal package/A2 chassis mounting/A4 Din-Rail mounting	85g/135g/175g(Typ.)
Cooling method	Free air convection	

EMC Specifications

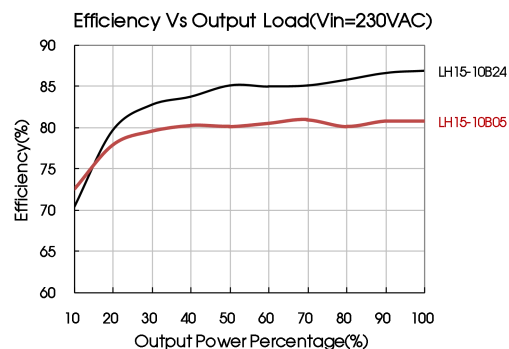
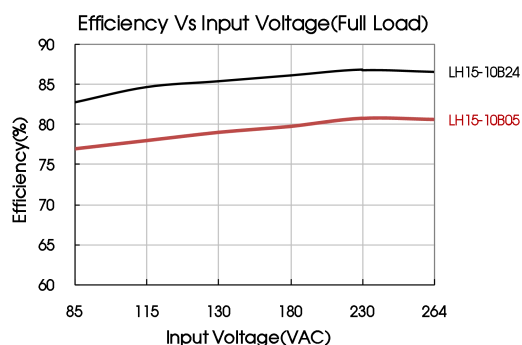
Emissions	CE	CISPR22/EN55022	CLASS B	
	RE	CISPR22/EN55022	CLASS B	
Immunity	ESD	IEC/EN61000-4-2	Contact $\pm 6\text{KV}$ /Air $\pm 8\text{KV}$	perf. Criteria B
	RS	IEC/EN61000-4-3	10V/m	perf. Criteria A
	EFT	IEC/EN61000-4-4	$\pm 2\text{KV}$	perf. Criteria B
		IEC/EN61000-4-4	$\pm 4\text{KV}$ (See Fig. 5 for recommended circuit)	perf. Criteria B
	Surge	IEC/EN61000-4-5	line to line $\pm 1\text{KV}$ /line to PE $\pm 2\text{KV}$	perf. Criteria B
		IEC/EN61000-4-5	line to line $\pm 2\text{KV}$ /line to PE $\pm 4\text{KV}$ (See Fig. 5 for recommended circuit)	perf. Criteria B
	CS	IEC/EN61000-4-6	10 Vr.m.s	perf. Criteria A
	PFM	IEC/EN61000-4-8	10A/m	perf. Criteria A
	Voltage dip, short interruption and voltage variation	IEC/EN61000-4-11	0%, 70%	perf. Criteria B

Product Characteristic Curve



Note: ① With an AC input between 85-100V/240-264VAC and a DC input between 100-120VDC/340-370VDC, the output power must be derated as per temperature derating curves;

② This product is suitable for applications using natural air cooling; for applications in closed environment please consult Mornsun FAE.



Design Reference

1. Typical application

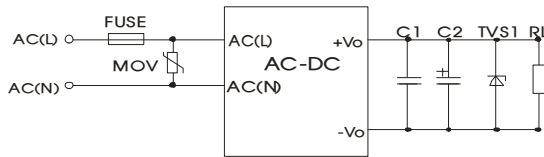


Fig. 1: Typical application diagram

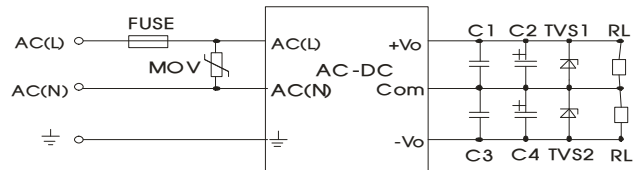


Fig. 2: LH15-10Axx (Dual Output) series typical application diagram

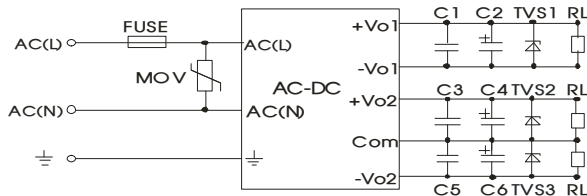


Fig. 3: LH15-10Cxx (Triple Output) series typical application diagram

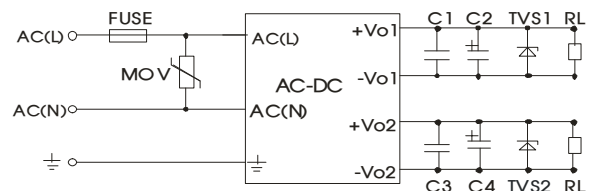


Fig. 4: LH15-10Dxx (Isolate Twin Output) series typical application diagram

Part No.	FUSE	MOV	C1/C3/ C5(uF)	C2(uF)	C4(uF)	C6(uF)	TVS1	TVS2	TVS3
LH15-10B03	2A/250V, slow-blow	S14K300	1	680	--	--	SMBJ7.0A	--	--
LH15-10B05				680	--	--	SMBJ7.0A	--	--
LH15-10B09				470	--	--	SMBJ12A	--	--
LH15-10B12				220	--	--	SMBJ20A	--	--
LH15-10B15				220	--	--	SMBJ20A	--	--
LH15-10B24				68	--	--	SMBJ30A	--	--
LH15-10A05				470	470	--	SMBJ7.0A	SMBJ7.0A	--
LH15-10A12				220	220	--	SMBJ20A	SMBJ20A	--
LH15-10A15				120	120	--	SMBJ20A	SMBJ20A	--
LH15-10A24				68	68	--	SMBJ30A	SMBJ30A	--
LH15-10C0505-05				470	220	220	SMBJ7.0A	SMBJ7.0A	SMBJ7.0A
LH15-10C0512-02				470	120	120	SMBJ7.0A	SMBJ20A	SMBJ20A
LH15-10C0515-02				470	120	120	SMBJ7.0A	SMBJ20A	SMBJ20A
LH15-10C0524-01				470	120	120	SMBJ7.0A	SMBJ30A	SMBJ30A
LH15-10D0505-08				470	470	--	SMBJ7.0A	SMBJ7.0A	--
LH15-10D0512-04				470	220	--	SMBJ7.0A	SMBJ20A	--
LH15-10D0515-03				470	120	--	SMBJ7.0A	SMBJ20A	--
LH15-10D0524-02				470	47	--	SMBJ7.0A	SMBJ30A	--

Output Filter Components:

We recommend using an electrolytic capacitor with high frequency, and low ESR rating for C2, C4, C6 (refer to manufacture's datasheet). Choose a Capacitor voltage rating with at least 20% margin, in other words not exceeding 80%. C1, C3, C5 is a ceramic capacitor used for filtering high-frequency noise and TVS is a recommended suppressor diode to protect the application in case of a converter failure.

2. EMC compliance recommended circuit

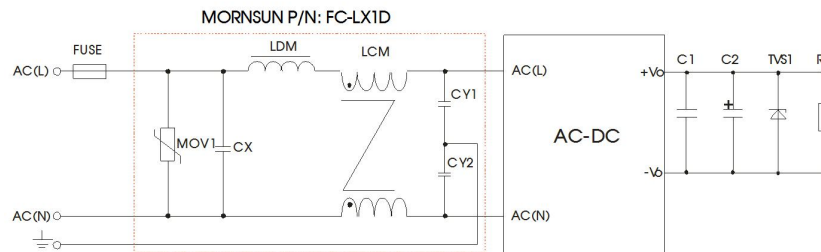
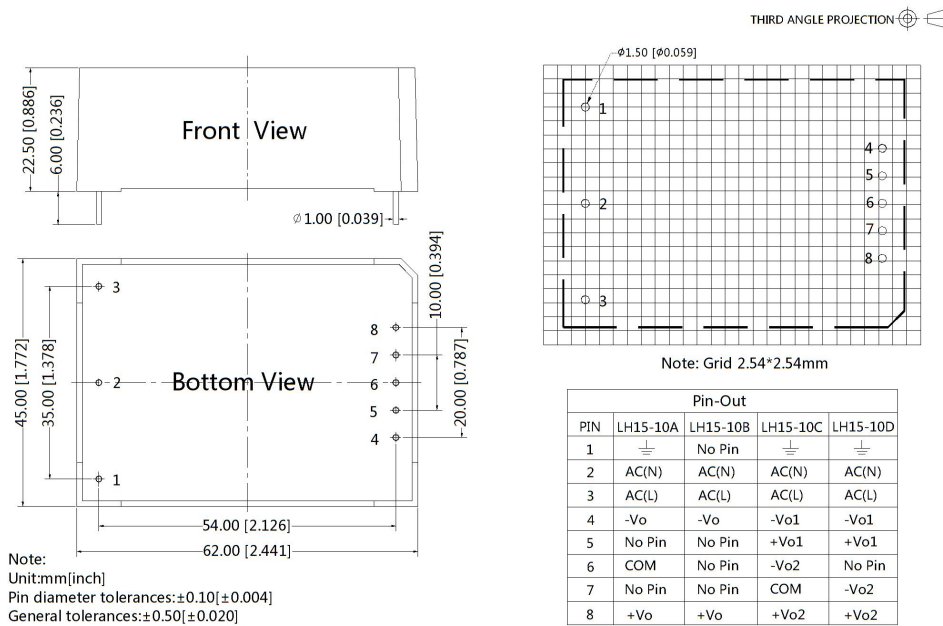


Fig. 5: EMC application circuit with higher requirements
(Output external circuit refer to the typical application circuit)

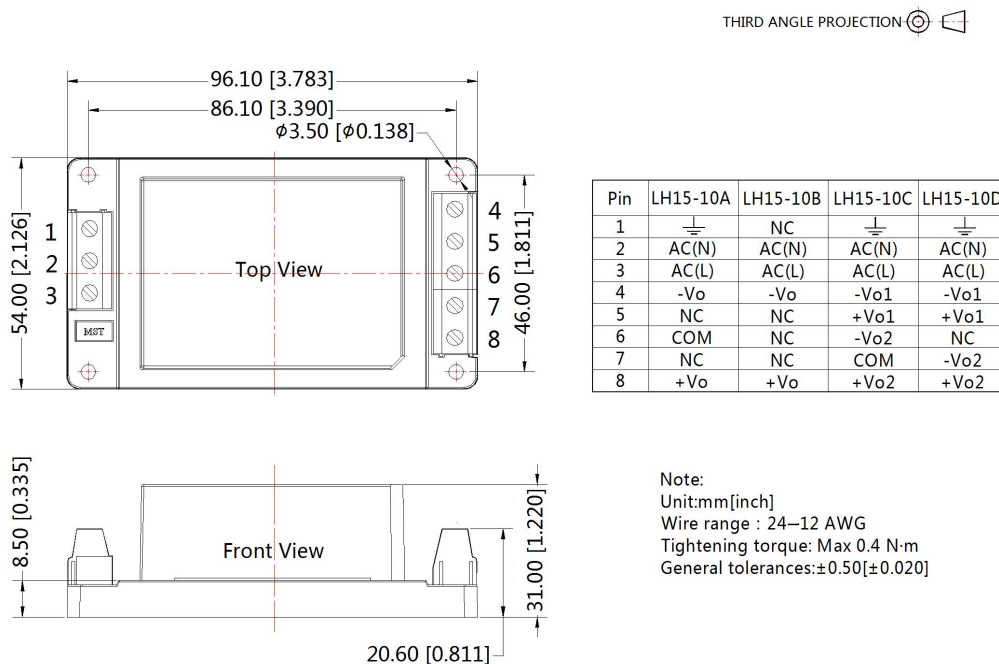
Element model	Recommended value
MOV1	S14K300
CY1/CY2	1000pF/400VAC
CX	0.1uF/275VAC
LCM	10mH, P/N: FL2D-Z5-103 (MORNSUN) is recommended
LDM	4.7uH/2A
FC-LX1D	2KV/4KV EMC filter
FUSE	2A/250V, slow-blow, required

3. For additional information please refer to application notes on www.mornsun-power.com.

Dimensions and Recommended Layout

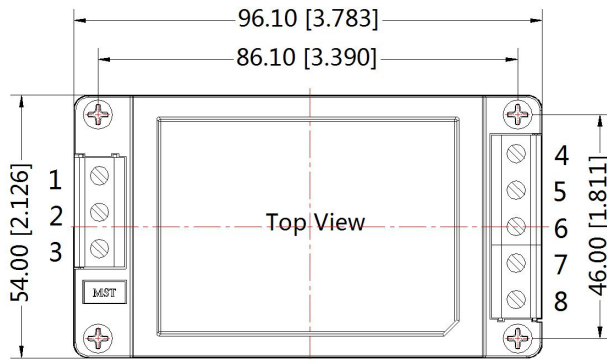


A2 Dimensions

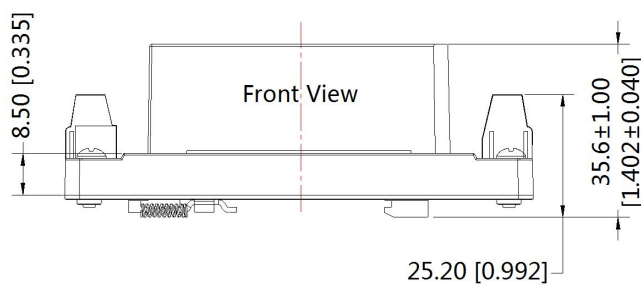


A4 Dimensions

THIRD ANGLE PROJECTION 



Pin	LH15-10A	LH15-10B	LH15-10C	LH15-10D
1		NC		
2	AC(N)	AC(N)	AC(N)	AC(N)
3	AC(L)	AC(L)	AC(L)	AC(L)
4	-Vo	-Vo	-Vo1	-Vo1
5	NC	NC	+Vo1	+Vo1
6	COM	NC	-Vo2	NC
7	NC	NC	COM	-Vo2
8	+Vo	+Vo	+Vo2	+Vo2



Note:
Unit: mm[inch]
Wire range: 24-12 AWG
Tightening torque: Max 0.4 N·m
Mounting rail: TS35, rail needs to connect safety ground
General tolerances: ±0.50[±0.020]

Note:

- For additional information on Product Packaging please refer to www.mornsun-power.com. Packaging bag number: 58220006; the Packaging bag number of A2/A4 package: 58220010;
- If the product is not operated within the required load range, the product performance cannot be guaranteed to comply with all parameters in the datasheet;
- Unless otherwise specified, parameters in this datasheet were measured under the conditions of $T_a=25^{\circ}\text{C}$, humidity<75% with nominal input voltage and rated output load;
- All index testing methods in this datasheet are based on our company corporate standards;
- We can provide product customization service, please contact our technicians directly for specific information;
- Products are related to laws and regulations: see "Features" and "EMC";
- Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units.

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